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DSSD CENSUS 2000 PROCEDURES AND OPERATIONS MEMORANDUM SERIES B-2

MEMORANDUM FOR Howard Hogan
Chief, Decennial Statistical Studies Division

From: Donna Kostanich DK
Assistant Division Chief, Sampling and Estimation
Decennial Statistical Studies Division

Prepared by: James Farber JEF
Sample Design Team

Subject: Overall Census and A.C.E. Quality Indicators (Prototype)

The attached document is a prototype of the report that we will prepare, per your request, following completion of applicable Accuracy and Coverage Evaluation Survey (A.C.E.) operations. The completed report is intended to aid the Executive Steering Committee on A.C.E. Policy (ESCAP) in its recommendation regarding the release of the statistically corrected data or the data without statistical correction as the P.L. 94-171 data. This report, together with other reports, will assess the operations and results of both the initial Census and the A.C.E. Both sets of assessments will be available to the ESCAP to aid the Committee in reaching its recommendation regarding the use of the statistically corrected data.

The attached prototype contains empty table shells that will assess specific aspects of the applicable operations. This report focuses on overall indicators of the quality of Census 2000 and the A.C.E. Several of the tables in this report also appear in other analysis and results documents. This document serves as a collection of the results that best summarize census and A.C.E. quality.

It is important to note that the conduct of the operations may lead us to modify the attached format by including additional information. It is also likely that descriptions and definitions will be enhanced or the data items could undergo revision. Conversely, we may conclude, for a variety of reasons, that some of the information set forth in the attached prototype may not be available. The attached document sets forth our conclusions prior to completion of the A.C.E. about what information would properly inform the ESCAP on this subject, but is subject to modification.

Accuracy and Coverage Evaluation 2000: Overall Census and A.C.E. Quality Indicators

prepared by James Farber

Introduction

The Accuracy and Coverage Evaluation (A.C.E.) survey checks the quality of Census 2000 population coverage. Using a sample of the population, the A.C.E. estimates the net proportions of people missed by the census (undercount) or erroneously included in the census (overcount), and produces population estimates that are corrected for these census coverage errors. Details of the A.C.E. design and operations can be found in Childers (2000).

Both the census and the A.C.E. have the potential to produce unreliable results due to statistical or operational errors. This document describes high level indicators of Census 2000 and A.C.E. quality to inform executive assessment of the A.C.E. population estimates. The yes or no decision to correct Census 2000 that Executive Steering Committee for A.C.E. Policy (ESCAP) must make depends on a complex interrelated set of quality indicators that exceeds the capacity of a single document. This report is not intended as a comprehensive evaluation of Census 2000 or A.C.E. quality, but rather as a summary of those indicators of quality that the ESCAP may want to consider in making its determination on census correction using the A.C.E.

This document contains highlights of census and A.C.E. quality indicators, followed by more detailed indicators that mainly cover A.C.E. operations and methods. In several sections, references are made to separate documents that contain further results or more complete definitions beyond those given in this report.

Prototype note: The final report will include indicators of census quality in each of the following categories: address list preparation, enumeration, follow-up, and data processing.

Highlights

A. What is the bottom-line on Census 2000 coverage? Is there differential coverage error?

Table 1 below summarizes the Census 2000 population estimates and coverage rates with standard errors (SE) as assessed by the A.C.E. for the total population and seven race/Hispanic origin domains. See Davis (2000) for more details on A.C.E. results and Appendix 1 for details on the race/origin domain definitions. These data can be used to form general conclusions about the quality of Census 2000 and to determine if historic patterns of differential undercount have persisted. Note that the A.C.E. net undercount percent measures the undercount only in regular housing units, which comprised the A.C.E. sampling universe. Group quarters and housing units in remote areas of Alaska

were ineligible for the A.C.E. Thus the Census 2000 counts below also include only the population in regular housing units and do not match the official census results.

Table 1: Census 2000 A.C.E. Estimates by Race/Origin Domain

Demographic Domain	Census 2000 Count	A.C.E. Estimate[1] (SE)	A.C.E. Net Undercount Percent (SE)
Total Population			
Domain 1 (Amer. Indian on Res.)			
Domain 2 (Amer. Indian off Res.)			
Domain 3 (Hispanic)			
Domain 4 (Black)			
Domain 5 (Native Hawaiian/PI)			
Domain 6 (Asian)			
Domain 7 (NH[2] White/Other)			

[1] Estimates are restricted to the population residing in housing units. Group quarters are excluded. Also, A.C.E. estimates in this report are the dual system estimates.
[2] "NH" means Non-Hispanic, not of Hispanic or Latino origin.

Prototype Note: Analysis is forthcoming.

B. How do the A.C.E. results compare to Demographic Analysis? What are the historical patterns in Demographic Analysis?

Demographic Analysis (DA) uses administrative information such as birth and death statistics, immigration data, and Medicare enrollments to estimate the population by age, sex, and race (Black and Non-black) at the national level. DA thus provides an independent assessment of the coverage of the census and the quality of the A.C.E. DA also gives an historical pattern of census coverage to ensure the consistency of A.C.E. coverage estimates. DA produces sex ratios, the proportion of males per every 100 females, to further check the demographic consistency of the A.C.E. estimates. Two different DA models, denoted DA-1 and DA-2, will be used to assess Black and Non-Black Census 2000 counts. From 1940 to 1990, one DA model was used for the Black and Non-Black DA estimates. Note the population estimates used to derive the DA net undercount percent include the total population residing in housing units or in group quarters. See Robinson (2000) for details on the two DA models, limitations in the DA estimates, and for further DA results and comparisons.

Table 2A: Demographic Analysis Estimates of Net Undercount Percent

Group	DA Model	DA Net Undercount Percent							A.C.E. Net Uct. % (SE)
		1940	1950	1960	1970	1980	1990	2000	2000
Total	-								
Black	1								
	2								
Non-Black	1								
	2								

Table 2B: Demographic Analysis Estimates of Sex Ratios

Group	DA Model	DA Sex Ratios					A.C.E. Sex Ratio
		1960	1970	1980	1990	2000	2000
Total	-						
Black	1						
	2						
Non-Black	1						
	2						

Prototype Note: Analysis is forthcoming.

C. How do the A.C.E. results compare to 1990 Post-Enumeration Survey results?

The Census Bureau assessed the coverage of the 1990 Census using a Post-Enumeration Survey (PES). The basic methodology of the 1990 PES was similar to the A.C.E., but there are some notable differences. Both surveys relied on a population sample independent from the census to determine census omissions and an enumeration sample of census records to determine erroneous inclusions. But the A.C.E. sample of more than 300,000 housing units is about twice as large as the 1990 PES. More detailed differences between the A.C.E. and the 1990 PES are noted below as appropriate.

Table 3 shows the population estimates and net undercount percentages from the 1990 PES for the total population and five major race/Hispanic origin groups. Note that these

major race/origin groups are not directly comparable to the seven A.C.E. race/origin domains due to differences in the post-stratification designs. In particular, the A.C.E. design allows for multiple race responses, which was not a feature of the 1990 Census. In addition, the larger sample size of A.C.E. enables the addition of post-stratification variables such as return rate. Haines (2000) details the A.C.E. post-stratification design. Also note that the 1990 PES results in Table 3 include the group quarters population, unlike A.C.E. results given in this report. See Thompson (1992) and Bureau of the Census (1992) for additional 1990 PES results.

Table 3: 1990 Census Estimates by Major Race/Origin Group

Race/Origin Group	1990 Census Count	PES Estimate (SE)	PES Net Undercount Percent (SE)
Total Population			
NH White/Other			
NH Black			
NH Asian or Pacific Islander			
NH American Indian on Res.			
Hispanic			

Prototype Note: Analysis is forthcoming.

D. How solid is the foundation of the A.C.E.? Part1: what are the interviewing results?

The A.C.E. data are collected via computer assisted personal interviewing (CAPI) conducted at a probability sample of housing units. The results of A.C.E. interviewing for interview day and Census Day are listed in the table below. The interview day outcome refers to the success of getting an interview during the A.C.E. process with a current resident or with a proxy. The Census Day outcome shows whether the Census Bureau was successful in getting information about the Census Day residents from the interview day resident or proxy. Feindt and Byrne (2000) includes further person interviewing results and Childers and Byrne (2000) have detailed explanations of the interview outcomes.

Table 4: A.C.E. Interview Results

Interview Outcome	Interview Day		Census Day	
	Housing Units	Percent	Housing Units	Percent
Complete interview with household member				
Complete interview with proxy				
Sufficient partial interview				
Field non-interview				
Insufficient information for all people in household				
Vacant on Census Day[1]				
No Census Day residents[2]				
Not a housing unit on Census Day				
Total				

[1] "Vacant on Census Day" means that the interviewer determined the Census Day vacancy status.
[2] "No Census Day residents" means that the household should have been counted somewhere else on Census Day. These are whole household nonresidents. See Childers (2000).

Prototype Note: Analysis is forthcoming.

E. How solid is the foundation of the A.C.E.? Part 2: how much data were missing in the A.C.E. and census? How does the level compare to the 1990 PES?

The quality of the census and A.C.E. data is affected by the amount of respondent-provided information; greater amounts of imputed data, for example, can negatively affect quality. The rates of missing or unresolved residence status and match status, along with the rates of missing data in the post-stratification variables, are provided in the tables below. Note that E-sample people cannot have an unresolved residence status and P-sample people cannot have an unresolved enumeration status. See Cantwell (2000) and McNally (2000) for further details on A.C.E. missing data and Census 2000 missing data, respectively. Similar results from the 1990 PES and 1990 Census are also given below, but note that the P sample in the A.C.E. consists of non-mover and out-mover households, while the 1990 PES P sample was non-movers and in-movers. This procedural difference could contribute to different unresolved and missing data rates between 1990 and 2000.

Table 5A: Overall A.C.E. and 1990 PES Unresolved Rates

Unresolved Characteristic	2000 A.C.E.		1990 PES	
	P Sample	E Sample	P Sample	E Sample
Residence Status		Not Applicable		Not Applicable
Match Status		Not Applicable		Not Applicable
Enumeration Status	Not Applicable		Not Applicable	
Total Persons				

Table 5B: Overall A.C.E. and 1990 PES Missing Data Rates

Missing Characteristic	2000 A.C.E.			1990 PES		
	P Sample	E Sample	Census	P Sample	E Sample	Census
Race						
Hispanic Origin						
Age						
Sex						
Tenure						

Prototype Note: Analysis is forthcoming.

F. How did the person matching work?

The results of the A.C.E. person match phase are summarized below for the total population. The number of people in each category is unweighted, while the rates are weighted by the final P-sample or E-sample weight. These results are collapsed over the full set of person match outcomes. Childers and Byrne (2000) includes more detail on person match codes and results.

Table 6A: Distribution of A.C.E. Person Matching Results for the P Sample

	Total Persons	Matches	Non-Matches	Out-of-Scope	Unresolved
Unweighted Number					
Weighted Rate					

Table 6B: Distribution of A.C.E. Person Matching Results for the E Sample

	Total Persons	Match	Non-Match CE[1]	Erroneous Enumeration					Unresolved
				Insuff. Info.[2]	Dup.[3]	Fict.[4]	GE[5]	Other Res.[6]	
Unwtd. Number									
Wtd. Rate									

[1] Correct Enumeration
[2] Insufficient Information for Matching
[3] Duplicate
[4] Fictitious
[5] Geocoding Error
[6] Other Residence

Prototype Note: Analysis is forthcoming.

ACCURACY AND COVERAGE EVALUATION QUALITY INDICATORS

This section provides more detailed quality indicators for each component of the A.C.E., their relationship to census or A.C.E. quality, and the benchmark or statistics used to measure quality. While some tables are included in the text below, there are many detailed tables and figures in appendices or separate documents as indicated.

A. Dual System Estimation and Variance

Dual System Estimation (DSE) is the methodology used to produce the A.C.E. estimates. A sample of census people and housing units, called the Enumeration sample or E sample, is compared to the independent A.C.E. sample of housing units and people, called the Population sample or P sample, to estimate census net coverage error. The DSE is computed within post-strata, groupings of the P-sample and E-sample people based on geographic characteristics, housing unit characteristics, and person characteristics. The goal of post-stratification is to maximize the homogeneity of the

samples with respect to the probability that a person was correctly enumerated in the census. Because the P sample and E sample are independent, the net proportions of matches, missed E-sample people, and correctly enumerated E-sample people within each post-stratum can be generalized to the entire population using synthetic estimation.

Like all statistical estimates based on samples, the A.C.E. estimates are subject to sampling variation. The coefficient of variation (CV) summarizes the variance for the A.C.E. estimates. In addition, several types of bias may affect the estimates, including correlation bias (Bell, 2000) and synthetic bias (Malec, 2000). Ratio estimation bias also affects the A.C.E. estimates, because they are non-linear functions of P-sample and E-sample results. However, ratio bias was not a problem in the 1990 PES, which used the same DSE methodology, and is not expected to be a problem for the A.C.E. (Fay, 1999). The A.C.E. has about twice the sample of the PES but only about 25 percent more post-strata, meaning each A.C.E. post-stratum should have a larger sample size than the similar 1990 PES post-stratum. Since ratio bias is generally a function of the post-strata sample sizes, the A.C.E. estimates should be less affected by ratio bias than the 1990 PES population estimates. (Prototype note: The final report will include some assessment of the magnitude of ratio bias.) The estimates are also subject to nonsampling error, such as non-interview and item nonresponse.

1. What are the A.C.E. results by post-stratum?

   Davis (2000) contains detailed results for the 448 post-strata, including:

   - P-sample size
   - E-sample size
   - Coverage Correction Factor
   - CV
   - Census count
   - A.C.E. estimate
   - Net undercount percent

   Prototype Note: Analysis is forthcoming.

2. What are the A.C.E. results for major classifications?

   The tables in Davis (2000) show aggregate census counts and A.C.E. estimates for major classifications, including the race/Hispanic origin domains, along with CVs and net undercount percentages for the household population.

Prototype Note: Analysis is forthcoming.

3. How does each estimation phase contribute to the final A.C.E. estimates?

Mule (2000) shows how each step of the estimation process contributes to the final A.C.E. estimates for the total population and for each of the 448 post-strata.

Prototype Note: Analysis is forthcoming.

B. Person Match Quality Indicators

The person match phase of the A.C.E. is the process in which the people in interviewed housing units, the P sample, are matched to census person records, the E sample, in the same sample areas. Person matching is divided into before follow-up matching, person follow-up, and after follow-up coding. Before follow-up is a computer and clerical process to determine which people match and which require follow-up. Field person follow-up is used to collect information to resolve the match status of certain P-sample non-matched people and enumeration status for E-sample non-matched people. After follow-up uses the results of the field follow-up to determine the final status of each person.

1. What were the results of person matching? How do they vary among demographic domains?

People who match between the P sample and E sample were counted correctly in the census. Except in certain cases, non-matched people in the P sample and E-sample are followed up to confirm their match status or enumeration status. P-sample people were missed by the census if they were field-verified as Census Day residents. E-sample people were correctly counted if they were field-verified as residents, otherwise they were erroneously enumerated. The status of some people in the P sample and E sample remains unresolved despite follow-up and requires imputation in A.C.E. missing data processing. The tables below present the after follow-up person match results for the total population and the seven race/Hispanic origin domains.

Table 7A: Distribution of A.C.E. P-Sample Person Match Results by Demographic Domain

Demographic Domain	Total Persons	Match	Non-Match	Out-of-Scope	Unresolved
Total Population					
Domain 1 (Amer. Indian on Res.)					
Domain 2 (Amer. Indian off Res.)					
Domain 3 (Hispanic)					
Domain 4 (Black)					
Domain 5 (Native Hawaiian/PI)					
Domain 6 (Asian)					
Domain 7 (NH White/Other)					

Table 7B: Distribution of A.C.E. E-Sample Person Match Results by Demographic Domain

Demographic. Domain	Total Persons	Match	Non-Match CE	Erroneous Enumeration	Unresolved
Total Population					
Domain 1 (Amer. Indian on Res.)					
Domain 2 (Amer. Indian off Res.)					
Domain 3 (Hispanic)					
Domain 4 (Black)					
Domain 5 (Native Hawaiian/PI)					
Domain 6 (Asian)					
Domain 7 (NH White/Other)					

Prototype Note: Analysis is forthcoming.

2. What are the P-sample match results by mover status?

A primary difference between the A.C.E. and the 1990 PES is that the A.C.E. P-sample consists of non-movers and out-movers, while the PES P-sample consisted of non-movers and in-movers. The table below decomposes the P-sample match results for the A.C.E. and the 1990 PES by mover status.

Table 8: P-Sample Person Match Rates by Mover Status

	Mover Status	Match Rate	Non-Match Rate	Out-of-Scope Rate	Unresolved Rate
A.C.E. 2000	Total Non-mover Out-mover				
1990 PES	Total Non-mover In-mover				

Prototype Note: Analysis is forthcoming.

3. What are the types of E-Sample erroneous enumerations?

As in the 1990 PES, many different E-sample person matching outcomes are classified as erroneous enumerations for estimation purposes. Table 9 shows the rate of each type of erroneous enumeration for the A.C.E. and the 1990 PES.

Table 9: Types of Erroneous Enumerations

	Insufficient Info. for matching	Duplicate	Fictitious	Geocoding Error	Other Residence
A.C.E. 2000					
1990 PES					

Prototype Note: Analysis is forthcoming.

4. How consistent are P-Sample and E-Sample responses?

People match between the P sample and E sample based on identifiers and characteristic data, such as name, race, and sex. Ideally, a matched person will provide the same response both on the census form, the source of the E sample, and in the A.C.E. interview, the source of the P sample. This response consistency ensures that the person is placed in the same post-stratum in the P sample and E sample. However, some data will be discordant due to imputation or to reporting errors. Table 10 below shows the degree of consistency between certain variables used for A.C.E. post-stratification: tenure, race, Hispanic origin, and age/sex. Note that the other post-strata variables, such as return rate, are processing variables that must be consistent for a matched person in the P sample and E sample.

This assessment of consistency includes only the cases that match in the P sample and E sample because the data for non-matches are not readily available. The table decomposes the matched cases into imputed and non-imputed to shed more light on the source of inconsistency. For imputed cases, inconsistency is usually introduced by the imputation procedure. For non-imputed cases, inconsistency is attributable to factors such as the data collection mode, time lag from reference day, proxy responses, or data capture difficulties. The table also includes unbalanced inconsistencies, showing the degree to which inconsistency is systematic. Systematic inconsistency may introduce classification error into the A.C.E. estimates. Farber (2000) presents further consistency results.

Table 10: Consistency of A.C.E. P-Sample and E-Sample Post-Stratification Variables

Variable	Matched Cases	Consistent Cases	Inconsistent		Non-Balanced	
			Cases	Percent	Cases	Percent
Tenure						
Non-Imputed						
Imputed						
Age/Sex						
Non-Imputed						
Imputed						
Race/Origin Domain						
Non-Imputed						
Imputed						

Prototype Note: Analysis is forthcoming.

5. What were the results of person match quality assurance?

The person match QA procedures checked the change rates for the two lowest staff levels: clerks and technicians. The change rate is the proportion of person match outcomes for the given staff level that were changed during review at a higher staff level. Note that not all cases were reviewed by higher levels. The QA checked a certain proportion of cases as a standard, with greater rates where problems were suspected. The table below shows the after follow-up change rates for clerks and technicians. Childers and Byrne (2000) contain more details and results of person match QA.

Table 11: A.C.E. Person Match Quality Assurance Results

Staff Level	Change Rate
Clerk	
Technician	

Prototype Note: Analysis is forthcoming.

6. What were the results of person follow-up quality assurance?

The person follow-up QA plan included a recontact of followed-up people to verify the initial contact by an enumerator. Each enumerator had a certain proportion of households recontacted as a standard, with higher rates of QA where problems were suspected. The table below gives the outcomes of the QA recontact. Passed cases had been correctly followed up, failed cases appeared to have been followed up but actually had not, and non-interviewed cases were not successfully recontacted. Childers and Byrne (2000) contain more details and results of person follow-up QA.

Table 12: A.C.E. Person Follow-up Quality Assurance Results

Outcome	Number of Cases	Percentage of QA Cases
Pass		
Fail		
Non-interview		
Totals		

Prototype Note: Analysis is forthcoming.

C. Accuracy and Coverage Evaluation Missing Data Quality Indicators

The A.C.E. missing data process consists of three basic steps. First, whole household non-interviews are accounted for using a weighting adjustment for interviewed housing units. Then the missing data for individual P-sample housing and person characteristics is imputed. Finally, the missing data process imputes a resolution for unresolved cases, such as unresolved P-sample residents and possible P-sample matches or E-sample correct enumerations. The results are then used in post-stratification and DSE. Overall P-sample missing characteristic rates are given in Table 5B in this document, while Cantwell (2000) provides further results and information on missing data processing.

1. How much weight had been given to non-interviewed housing units and how was it redistributed to interviewed housing units in the P sample?

   The non-interview adjustment is the process in which the weights of non-interviewed P-sample housing units are spread proportionally to successfully interviewed housing units. The weights are spread to housing units that have similar characteristics to minimize bias. Table 13 gives summary statistics on the weights of non-interviewed housing units, while the figures in Appendix 2 depict the distribution of housing unit weights before and after the non-interview adjustment. Non-interviews can refer both to interview day or Census Day households, so each is listed. Weighted results use the final P-sample weights.

Table 13: Summary Statistics of A.C.E. Non-Interviewed Housing Units

	Non-Interviewed Housing Units	Unweighted	Weighted
Interview Day	Number		
	Percent of Total Housing Units		
Census Day	Number		
	Percent of Total Housing Units		

Prototype Note: Following production, histograms in Appendix 2 will show the housing unit weight distributions before and after the non-interview adjustment.

Prototype Note: Analysis is forthcoming.

2. What is the distribution of P-sample residence status before and after residence status imputation?

For some interviewed P-sample housing units, the residence status of a household member remains undetermined after person follow-up, and is imputed in the A.C.E. missing data process. The table below shows the weighted distribution of residence status before and after imputation for P-sample people. Residence status imputation was not done in the 1990 PES and thus the A.C.E. and the PES are not comparable.

Table 14: Weighted Results of A.C.E. Residency Status Imputation

	Resident	Non-Resident	Unresolved	
			Insufficient Info.	Other
Before Imputation				
After Imputation				

Prototype Note: Analysis is forthcoming.

3. What is the distribution of P-sample match status before and after match status imputation?

As with residence status, the match status of a P-sample person may be unresolved despite the attempts of field follow-up and requires imputation. The distribution of weighted P-sample match status before and after imputation is shown below, along with similar results from the 1990 PES.

Table 15: Weighted Results of A.C.E. Match Status Imputation

		Match Status				Match Rate
		Match	Non-Match	Unresolved		
				Insufficient Info.	Other	
A.C.E.	Before Imputation					
	After Imputation					
1990 PES	Before Imputation					
	After Imputation					

Prototype Note: Analysis is forthcoming.

4. What is the distribution of E-sample enumeration status before and after enumeration status imputation?

An E-sample person may have an unresolved enumeration status after person follow-up. The weighted enumeration status of each E-sample person is shown before and after imputation below, along with similar results from the 1990 PES.

Table 16: Weighted Results of A.C.E. Enumeration Status Imputation

		Enumeration Status				CE Rate
		Correct	Erroneous	Unresolved		
				Insufficient Info.	Other	
A.C.E.	Before Imputation					
	After Imputation					
1990 PES	Before Imputation					
	After Imputation					

Prototype Note: Analysis is forthcoming.

D. Targeted Extended Search Quality Indicator

For certain block clusters, the A.C.E. included targeted extended search (TES), an extension of the search area to one surrounding ring of census blocks for person matching. The goal of TES is to reduce the variance of the estimates by reducing the number of unresolved and non-matched cases in the person matching phase. Some of these block clusters are targeted with certainty due to a high proportion of weighted or unweighted geocoding error or A.C.E. non-matches identified during the initial housing unit phase, or because they were relisted clusters. Other TES clusters are selected at random. The goal of TES was to bring the geocoding error and non-match rates of TES clusters in line with non-TES clusters. The table below shows the national P-sample match rate and E-sample correct enumeration rate for TES and non-TES cases.

Table 17: A.C.E. Rates by TES Status

	Correct Enumeration Rate	Match Rate
TES Cases		
Non-TES Cases		
Total		

Prototype Note: Analysis is forthcoming.

E. Accuracy and Coverage Evaluation Interview Quality Indicators

An A.C.E. interview is attempted at all housing units in the sample. While successful interviews with a household member are obtained at most of the housing units, some interviews are conducted with proxy respondents, such as building managers or neighbors, and some interviews are not successful and the housing unit is nonrespondent. The total interviewing workload was 300,913 housing units in the United States. Feindt and Byrne (2000) includes more detail and results of A.C.E. interviewing.

1. Does the distribution of interviewed sample differ by stage of interview?

The A.C.E. interview was conducted in two stages: telephone and personal visit. Initial A.C.E. interviewing used the telephone. When a census mailback response from certain types of housing units in the A.C.E. sample areas included a telephone number, a telephone interview was attempted. Telephone interviewing potentially resulted in less recall bias and fewer movers. About 30 percent of the total interviewing workload was completed by telephone. The second stage of interviewing was personal visit interviewing.

Table 18: Distribution of the A.C.E. Sample by Stage of Interview and Mover Status

Mover Status	Telephone		Personal Visit	
	Percent	Match Rate	Percent	Match Rate
Total Persons				
Non-Movers				
Out-Movers				
In-Movers		Not Applicable		Not Applicable

Prototype Note: Analysis is forthcoming.

2. How much of the sample went to Nonresponse Conversion?

Nonresponse conversion (NRCO) is the process in which the best interviewers attempt to obtain interviews at housing units where previous efforts have not been successful. The table below shows the number of cases that entered NRCO and their outcomes.

Table 19: A.C.E. Nonresponse Conversion Results

	Interview	Refusal	Vacant	Non-Existent	Total NRCO Cases
Number of Cases					
Percent of NRCO Cases					100%

Prototype Note: Analysis is forthcoming.

3. What were the results of interviewing quality assurance?

The interviewing QA involved a reinterview at a sample of housing units to verify that the unit had been interviewed. A random sample of about 5 percent of the housing units comprised one part of the QA, while a targeted sample of about another 5 percent was available as needed to handle potential problems. Cases failed QA when the QA checker found that the unit had not been interviewed, at which point an A.C.E. interview was done. The table below shows the rates and outcomes of the interviewing QA procedures.

Table 20: A.C.E. Person Interviewing Quality Assurance Results

QA Outcome	Random QA	Targeted QA	Total
Pass			
Fail			
Total	100%	100%	100%

Prototype Note: Analysis is forthcoming.

4. How much time lapsed between Census Day and the collection of the A.C.E. data?

The quality of interviews can vary depending on the date when the interview was conducted. For example, interviewers were trained not to use proxy respondents during the first three weeks a unit is assigned for interviewing. Thus earlier interviews may be of higher quality because they generally were conducted with a household member. Likewise, interviews conducted further from Census Day may be more subject to recall bias. The table in Appendix 3 shows the timing of the telephone and personal visit interviewing phases for each Local Census Office

(LCO), while the figure in Appendix 4 shows the cumulative distribution of completion of the housing unit interviewing workload for each A.C.E. Regional Office (ACERO).

Prototype Note: Analysis is forthcoming.

F. P Sample and E Sample Weight Quality Indicators

The housing units and people in the P sample and E sample are weighted to account for the total number of housing units or people that each sample unit represents. The size, distribution, and computation of the weights potentially affect the variance and bias of the A.C.E. estimates.

1. How many clusters had their weights trimmed and by how much?

Weight trimming is the procedure to control the influence of outlier clusters by reducing the weight applied to the cluster and its housing units and people. Weight trimming may introduce bias into the estimates but reduces variance, with the overall goal of reducing total mean squared error. Clusters were identified for weight trimming by computing an estimate of weighted net error. The list of clusters requiring weight trimming is provided below with their weighted net errors before and after trimming, along with the national total weighted net error before and after trimming. The cluster codes in Table 21 have been changed from their actual codes to prevent disclosure.

Table 21: A.C.E. Weighted Net Errors for Trimmed Clusters and All Clusters

Cluster Code	Estimated Weighted Net Error Before Trimming	Weighted Net Error After Trimming
All Clusters		

Prototype Note: Analysis is forthcoming.

2. How much weight variation is there?

The figures in Appendix 5 show the amount of cluster weight variation and housing unit weight variation overall and for each state. There are separate figures for the P-sample and E-sample weights.

Prototype Note: Analysis is forthcoming.

3. How many influential clusters are there and how much influence do they have?

Even after weight trimming, certain clusters could exert disproportional influence on the estimates for a variety of reasons, such as a high weight combined with a high concentration of a relatively small post-stratum group. The list below shows the clusters identified as influential using alternative methods such as a jackknife procedure in which each cluster is removed and estimation is redone excluding the removed cluster. The cluster codes in Table 22 have been changed from their actual codes to prevent disclosure.

Table 22: A.C.E. Influential Clusters

Cluster Code	Influence Statistic (to be determined)

Prototype Note: Analysis is forthcoming.

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Race/Hispanic Origin Domain

The Race/Hispanic origin domain assignment is hierarchical. See Haines (2000) for more detail.

Domain 1 (American Indian or Alaska Native on reservations) includes:

- Any person living on a reservation indicating American Indian or Alaska Native either as their single race or as one of many races, regardless of their Hispanic origin.

Domain 2 (American Indian or Alaska Native off reservations) includes:

- Any person living in Indian Country[1] but not on a reservation who indicates American Indian or Alaska Native either as their single race or as one of many races, regardless of their Hispanic origin.
- Any non-Hispanic person not living in Indian Country who indicates American Indian or Alaska Native as their single race.

Domain 3 (Hispanic) includes:

- All Hispanic persons who are not included in Domains 1 or 2.
- All Hispanic persons who self-identify with three or more races (excluding American Indian or Alaska Native in Indian Country).
- All Hispanic persons who do not live in the state of Hawaii who classify themselves as Native Hawaiian or Pacific Islander, regardless of whether they identify with a single or multiple race.

[1] Indian Country is land considered (either wholly or partially) on an American Indian reservation/trust land, Tribal Jurisdiction Statistical Area, Tribal Designated Statistical Area, or Alaska Native Village Statistical Area. For Census 2000, Tribal Jurisdiction Statistical Area has been formally renamed as Oklahoma Tribal Statistical Area.

Domain 4 (Non-Hispanic Black) includes:

- Any non-Hispanic person who indicates Black as their only race.
- Any person identifying with a combination of Black and American Indian or Alaska Native not in Indian Country.
- Any person who indicates Black and another single race group (Native Hawaiian or Pacific Islander, Asian, White, or "Some other race").
- All Non-Hispanic Black persons who do not live in the state of Hawaii who classify themselves as Native Hawaiian or Pacific Islander.

Domain 5 (Native Hawaiian or Pacific Islander) includes:

- Any non-Hispanic person indicating the single race Native Hawaiian or Pacific Islander.
- Any non-Hispanic person who identifies with the race combination of Native Hawaiian or Pacific Islander and American Indian or Alaska Native not in Indian Country.
- Any non-Hispanic person who identifies with the race combination of Native Hawaiian or Pacific Islander and Asian.
- All persons living in the state of Hawaii who classify themselves as Native Hawaiian or Pacific Islander, regardless of their Hispanic origin and whether they identify with a single or multiple race.

Domain 6 (Non-Hispanic Asian) includes:

- Any non-Hispanic person indicating Asian as their single race.
- Any person who self-identifies with Asian and American Indian or Alaska Native not in Indian Country.

Domain 7 (Non-Hispanic White or "Some other race") includes:

- Any Non-Hispanic person indicating White or "Some other race" as their single race..
- Any Non-Hispanic person who self-identifies with both American Indian or Alaska Native not in Indian Country and White or "Some other race."
- Any person who self-identifies with Asian and White or Asian and "Some other race."
- Any non-Hispanic person who self-identifies with three or more races (excluding American Indian or Alaska Native in Indian Country).
- Any Non-Hispanic White or Non-Hispanic "Some other race" person who classifies themselves as Native Hawaiian or Pacific Islander but does not live in Hawaii, regardless of whether they identify with other races.

Histograms of weight variation before and after non-interview adjustment.

Timing of A.C.E. Interview Stages by Local Census Office

Local Census Office Code	Telephone Stage		Personal Visit Stage	
	Start Date	Finish Date	Start Date	Finish Date
National				

Graphs of cumulative distribution of completion of the housing unit interviewing workload for each A.C.E. Regional Office (ACERO).

Boxplots of P-sample and E-sample cluster weight variation and housing unit weight variation overall and for each state.